

Buffalo over the leased Erie Railroad right-of-way to and through the Tonawandas to the former Erie station in Lockport. From Lockport to Olcott the track is on the International Railway's right-of-way through the thickly-populated fruit and produce district between the Lock City and Lake Ontario. Between the Tonawandas and Olcott standard steam railroad equipment is handled for freight service by electric locomotives, three of the latter being owned by the company. In addition to the carload freight and l.c.l. shipments, the company operates during each fruit season a "fruit express" by which fruit and produce is transported from stations north of Lockport direct to the Elk Street market in Buffalo. Ten special motor cars are used for this service during the height of the season.

The interurban portion of this division consists of 32.5 miles of road 12 1/3 miles of which, between Tonawanda and Lockport, has recently been double-tracked. Operation had always been on standard rules, namely, time-tables and train orders with dispatchers on duty while cars are in operation. In 1913 it was determined that, owing to the increase in number of trains and the continued growth of traffic, the system of train dispatching by use of the telegraph with operators at the principal stations along the line, was becoming obsolete and would not long fulfil requirements for safe operation. In December, 1913, the telephone system with all-metallic circuit was installed for messages of this character. At the same time the services of operators were discontinued, the dispatchers delivering orders direct to the train crews. At this time there were but 2 1/3 miles of double track on the division, and notwithstanding the fact that the six months period immediately following the change was one of construction with large numbers of work extras on the line daily, the results from the standpoints of safety and continuity of operation, especially, have been most gratifying.

Mr. Dickson also described the operations of the Niagara Falls and Scenic Belt Line which are, perhaps, the most widely-known scenic electric railways in the world. On heavy days both of these lines are operated on a three-minute headway.

Speaking of city fares Mr. Dickson said that up to the year 1892 no universal transfer privileges had been allowed to Buffalo local riders. A few transfers were granted, but as a rule it was necessary to pay an extra fare, usually an exchange ticket costing 3 cents. On the first horse railway, a 3-mile ride cost 12 cents; to-day a 12 1/2-mile ride could be obtained for 5 cents under the broad transfer system in vogue.

GENERAL STATISTICS

The cost of the first power station in Buffalo in 1892 was \$285,000, compared with an appraised value of \$2,180,712 for the power stations and substations of 1913, despite which increase the company secures most of its electrical energy from Niagara Falls. In fact, during 1913 the average energy purchased a day was 260,625 kw-hr., while that taken from the steam standby plant was only 15,530 kw-hr. a day. In addition, the company's own hydroelectric plant generated 10,075 kw-hr. a day in 1913.

The total mileage of the system, single-track, is 396. For this trackage the company provides on a regular week-day schedule 10,628 single trips each twenty-four hours. A steam railroad, Mr. Dickson said, would be proud to have 98 per cent of its trains on time although all operation was over right-of-way. Yet if the International Railway, which must operate very largely over public streets open to other traffic, made an equivalent showing by being late 200 out of 10,628 trips the citizens would soon be carrying complaints to the Public Service Commission. During 1913 his company car-

ried 231,509,275 passengers, of whom 52,080,550 were transfer passengers. The number of passenger car-miles was 21,222,760.

In conclusion, speaking as a former steam railroad man, Mr. Dickson said that when he entered electric railway service its intricacies were as surprising to him as some of the data submitted might be to his audience; but it was a great and interesting business with tremendous possibilities, notwithstanding the many unpleasant features connected with it.

The paper was followed by an informal discussion and the election of officers for the new year. Secretary Vought urged the members to enlist the electric railway men of the Buffalo district, following the example of the New York Railroad Club.

Experiences with 2400-Volt Locomotives *

Maintenance Costs and Methods on Butte, Anaconda & Pacific Electrification—Roller Pantographs—Arcing at Contactors

In the discussion on J. B. Cox's paper on the Butte, Anaconda & Pacific Railroad electrification, which was published in the *ELECTRIC RAILWAY JOURNAL* for Nov. 7, 1914, the author stated that the steel rollers on the pantographs of the electric locomotives collected 600 amp at speeds ranging from 16 m.p.h. to 20 m.p.h. quite satisfactorily, a mileage of from 10,000 to 12,000 being obtained. The sliding type is simpler than the roller collector and is preferable to it, even with half the life in mileage and with equal wear on the trolley. Currents up to 3000 amp have been collected without sparking by a single pantograph with a double sliding collector.

The cost of maintenance of the distributing system, as given in the paper, covered all items chargeable to this account, which were principally for material, labor and work-train service and were at the rate of approximately \$125 per mile per year. The cost given for electric locomotive maintenance, including depreciation, should be less in the future. This is because the published figure, 7.47 cents, included 2.46 cents for depreciation, leaving 5.01 cents per mile for actual repairs, and this latter figure included the cost of considerable experimenting with pantograph rollers and minor improvements. Again, it is natural to expect the workmen will become more familiar with the new equipments. Mr. Cox added that it was easier to break in old steam organizations to operate and take care of electric locomotives than to train electrical men who had not had previous steam railroad experience.

To familiarize the workmen with the electric locomotives a general shop inspection and overhaul was made after the first year's service. The locomotives were each in the shop one week, whereas four weeks were required on an average for the steam locomotives for a similar overhaul, and the costs in each case were about proportional to the time in the shops. The tires on the drivers of the electric locomotives averaged somewhat more than double the mileage between turnings obtained from those under the steam locomotive, although the numerous sharp curves on the system result in rapid wear of the flanges. The author believed that on the first installation of a new type locomotive on any road, whether electric or steam, the adaptation and development charges during the first year were likely to make up for the smaller amount of general repair work required during the first year.

Referring to the matter of the burning out of contactors on the locomotives due to dust or to irregularity in following the proper sequence of operations, Mr. Cox

* Abstracted from Proceedings of American Institute of Electrical Engineers for January, 1915.

said that there had been no instances of serious trouble. There had been instances of flashing-over of insulators at the back of the contactors which was thought to have been due to the accumulation of dust from the ore, as this contains some copper. But these arc-overs were discovered only at inspections and apparently had occurred when the contactors were opening the circuit, thus breaking the current before the arc did anything more than burn off the dust. They gave no trouble. No difficulty with contactors has been experienced when the motors were changed from the series to the parallel position, nor had any contact tips been changed. On the whole the contactors on the locomotives show less signs of arcing or burning than on an ordinary 600-volt locomotive in a similar service. The commutators of the main motors also are in splendid condition and look as if they had recently been turned.

Meeting of Massachusetts Association

At the monthly meeting of the Massachusetts Street Railway Association at Young's Hotel, Boston, on Jan. 13, Arthur A. Ballantine, counsel for the Middlesex & Boston Street Railway, discussed the recent decision of the Massachusetts Public Service Commission authorizing the increasing of fares on the system. This case was abstracted in the *ELECTRIC RAILWAY JOURNAL* of Nov. 7, 1914, page 1055. Mr. Ballantine brought out that under the public service act a company cannot put a change in fares into effect until the commission has had at least thirty days' notification. The Middlesex & Boston proceedings extended from July 1, 1914, to Oct. 28, 1914, and the company had lost the benefit of an increased revenue during its heavy summer riding period. He thought the time element required to conduct such cases should be taken into account by other companies contemplating proceedings of this character.

Mr. Ballantine paid a high tribute to the manner in which the board set forth the fundamental principles at stake in the case and outlined the bearing of the findings upon the future of electric railways in Massachusetts. The full petition of the company was not granted, but pending the working out of the fares adopted the company is endeavoring to give a fair trial to the rates, hoping that in due course the additional revenue needed will be authorized, when it is seen that the realization of all that the commission expressed itself in favor of on principle cannot be obtained under the present schedules. The company desired to increase its gross receipts by about \$110,000 per year. The decision of the board yields about \$80,000 additional income per annum, corresponding to a rate of return of about 3.5 per cent on the stock. The recognition by the commission of the fundamental needs of capital, however, gives the company every reason to believe that its legitimate requirements will be taken care of in due course. The decision marks a turning point for electric railways in Massachusetts toward a more equitable return upon their efforts to serve the public.

Exhibit at A. R. M. M. and M. C. B. Convention

The Railway Supply Manufacturers' Association has issued its annual circular in regard to the exhibit at the American Railway Master Mechanics' Association and the Master Car Builders' Association at Atlantic City this June. The Master Mechanics' meeting will be held from June 9 to 11 inclusive and the Master Car Builders' from June 14 to 16 inclusive. The exhibit, as usual, will be held on Young's Million Dollar Pier. The charge for space, in addition to the membership dues of \$15, is 40 cents per square foot. Space will be as-

signed on Feb. 19, and those who desire to exhibit are requested to send in their applications before that date to the secretary, J. D. Conway, Oliver Building, Pittsburgh, Pa.

COMMUNICATION

Interest Rates on Public Utility Bonds

WELSH BROTHERS: INVESTMENT BONDS

PHILADELPHIA, PA., Jan. 12, 1915.

To the Editors:

I note with interest the discussion in your columns upon the rates of interest which will obtain throughout the remainder of the war and the reconstruction period which must follow the re-establishment of peace. An estimate may be offered as to the general trend, certain guesses (more or less intelligent) as to the details. My personal opinion is as follows:

Rates for liquid capital, which is largely used to complete commercial transactions, will remain low for some months to come. Production and trade should increase materially in 1915 and cause the rates for liquid capital to harden. The rise in these rates should be regulated and checked by at least three main factors in the general situation: (1) While certain lines of manufacture and trade will doubtless be abnormally stimulated by war conditions, the average for all industries the country over should not cross (if it reaches) the line of normal; (2) speculation in securities should continue much restricted by steady, though governed, liquidation for European account, if not by arbitrary regulations imposed by the exchanges; (3) the possibility of gold imports due to large commercial export balances and favored by low rates in London.

Rates for capital to be permanently invested in plant account should remain high throughout the war, partly on account of uncertainty, largely because the great financial countries of the world are destroying capital and to that end will be seeking to borrow here instead of lending as in the past. The reconstruction to follow the war will be difficult. Many concerns carried along by others till then will be thrown on their own resources, to stand or fall as the case may be. Hundreds of millions of fiat money will have to be retired or repudiated before the issuing countries will attain financial soundness. Though at that time prostration of business may result in the maintenance of low rates for the liquid capital needed to complete a comparatively small volume of commercial transactions, the accumulated destruction of fixed capital and the doubt as to the solvency of individuals, corporations and nations abroad should make capital for permanent investment dear both abroad and here. Most economists, I think, believe that the destruction of capital in the Russo-Japanese and Balkan wars and in such catastrophes as the San Francisco fire had a perceptible effect on interest rates. The destruction resulting from this war will, of course, be many times that occasioned by all of the above disasters combined. The effects of the present unparalleled destruction will be mitigated, but not, I hold, nullified by business depression, enforced economies and the return into circulation of hoarded gold.

Assuming high rates for fixed capital, what will the effects be upon the corporations of this country, more particularly those engaged in so-called "public service"?

The results thus far have been peculiarly confusing. In this local market accumulated funds for investment have been to a considerable extent released and (excepting equipments and other short term securities) have gone chiefly into old, well-known railroad bonds and bonds of municipalities. The prices of such long term